Appendix DScenario OutlineForm ES-D-1

Facility: Comance Peak (CPSES) Scenario No.: 1 Op-Test No.: 2001

Examiners: Operators: _____
_____
_____

NOTE: SRO Admin A.4, Emerg Class. is to be done in conjunction with this Scenario
PRELOAD - MET Tower Data B> wind 105

Initial Conditions: 870 - 880 MWE and steady. EDG 1-01 is out of service for preventive maintenance (12 hours into LCO). Severe thunderstorm warning and high winds issued and ABN-907, Section 5 completed.

Turnover: The previous shift just completed turbine valve testing and the shift has been directed to return to 100% (8%/hr< rate of increase <10%/hr).

Time (T) = 0 at end of power increase B> as directed by Chief Examiner

Event No.	Malf. No.	Event Type*	Event Description
**1 T= 0		N (SRO) R (RO) N (BOP)	Increase reactor power back to 100%
2 T= E1+0	RX04C	I (SRO) I (RO)	S/G 3 Level Transmitter LT-553 fails low **(If RO or BOP goes to place bistables in trip, start Event 3)**
3 T= E1+7	TC05A	C (SRO) C (BOP)	#1 Main turbine control valve fails closed
4 T= E1+15	ED06G	C (All)	Loss of 1D3 bus
5 T= E1+18 E1+20	RC03D	C (RO) C (SRO)	RCP 4 vibration - initial severity @ 9 mils and ramp severity to 25 mils over 30 min. High vib. alarm on RCP 4 (shaft) alarms at 15 mils & increasing @ approx 0.5 mils/min. Manual Rx Scram due to high RCP 1-04 vibrations, no SI. Enter EOP-0.0A and then transition to EOS-0.1A.
6 T= E19+10	ED01	M (All)	Lighting strike in switchyard - loss of offsite power. EDG 1-02 starts and loads (E19 triggers automatically when the reactor is tripped)
7 T= E19+16	EG07B	C (All)	EDG 1-02 trips (overspeed) - loss of all power. Transition to ECA-0.0A and possibly ABN-601.
T= E19+26			EDG 1-02 is restarted after S/G depressurization has started per ECA-0.0A.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

** Trigger E1 after sufficient power increase has been seen - per Chief Examiner

Scenario Number: 1	Event Number: 1	Facility: CPSES

Brief Description: Increase reactor power to 100%

Expected Operator/Plant Response	RO	BOP	US
Time: 0 (Time = 0 after Chief Examiner determines he has seen enough of the power increase)			
Annunciators:			
None			
1) Increase reactor power per IPO-003A			
! Provide shift briefing			
! Initiate RCS boration using SOP-104A			
! Set the desired loading rate on the LOAD GRADIENT device			
! Slowly raise the LOAD REFERENCE device to 1150 MW while controlling the rate of turbine power increase			
Note to Simulator Operator: 4 minutes after Crew assumes the watch, call the control room and tell them that the National Weather Service has issued a severe thunderstorm warning with the possibility of high winds fo Somervell County (next 4 hours)			

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 2	Facility: CPSES

Brief Description: S/G 3 Level Transmitter LT-553 fails low

Expected Operator/Plant Response	RO	BOP	US
Time = E1+0			
Annunciators:			
SG 3 1 of 4 LO-LO (8A-3.14)			

1) Direct and Implement the actions of ABN-710

- ! Verifies controlling level channel failed
- ! Manually controls feedwater to S/G 1-03, using 1-FK-530
- ! Select alternate 1-LS-539C for S/G 3
- ! Check stable level, and feed/steam flow matched, then place controller in auto and check for proper response.

2) Refers to: T/S 3.3.1, 3.3.2 B> within 6 hrs place channel in trip
T/S 3.3.3-1 B> no action

3) Contacts Prompt Team and Ops Management

Critical task - Rx does not trip on low S/G level

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 3	Facility: CPSES

Brief Description: #1 Main Turbine control valve fails closed

Expected Operator/Plant Response	RO	BOP	US

Time = E1+7 min

Annunciators:

None

Note for simulator operator - If asked, as PEO, report no apparent reason for #1 CV closure

1) Determines turbine/reactor power change - informs US

2) Ensure rod control and steam dumps maintain RCS temperature

3) Determines turbine control valve closed

4) Directs and Implements ABN-401

- **!** Verifies S/G level control, PRZR level control, and PRZR pressure control working correctly
- **!** Verify turbine load stable and match LOAD REFERENCE indication with existing load
- **!** Reduce turbine load until all operable HP control valves indicate <100% open
- **!** Check status of ALL main turbine stop and control valves

5) Notify PSO, plant management, and prompt team

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 4	Facility: CPSES
Brief Description: Loss of 1D3 Bus		

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1+15 min			
Annunciators:			
BATT CHRG BC1D3-1/BC1D3-2 SWITCH PNL 1D3 TRBL (2.19)			
1) Performs actions of ALM-0102			
! After performing a board walkdown, observes that 1D3 voltage is pegged low (1-CB-11) and announces loss of 1D3 bus (this can be difficult to identify - will require some good analysis)			
! Send PEO to equipment to check			
! Determines that RCPs can not be tripped from control room			
2) Refers to T/S 3.3.1			

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 5	Facility: CPSES
Brief Description: High Vibration on RCP 1-04 (shaft)		

Expected Operator/Plant Response	RO	BOP	CRS
Time= E1+18 min			
Annunciators:			
RCP 4 VIBR HI (5B-4.5)			
1) Directs and Implements ABN-101			

! **Trip the reactor due to high rate of RCP vibration increase**. Make plant announcement

! Go to EOP-0.0A

! Stop RCP 1-04 - locally (call to have AO open breaker)

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 5 (cont)	Facility: CPSES
Brief Description: RX Scram		

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1+20 min			
Annunciators:			
LOTS			
1) Directs and Implements EOP-0.0A			
! Verifies Rx trip and bypass breakers open and neutron flux decreasing			
! All rod bottom lights on			
! Verifies turbine trip			
! Verify power to AC safeguards busses			
! Determines SI not required and transitions to EOS-0.1A			

2) Directs and Implements EOS-0.1A

! Checks RCS Tave stable or trending to 557ºF

! Check: FW status, PRZR level and PRZR pressure control

! Maintain plant conditions stable:
PRZR pressure **B**> 2220 - 2250 psig
PRZR level **B**> 23% - 31%
SG narrow range level **B**> 5% - 50%
RCS Tave **B**> 555ºF - 559ºF

3) Contact plant management (maintain hot standby)

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 6	Facility: CPSES

Brief Description: Switchyard lighting strike - loss of offsite pwr (EDG 1-02 starts and loads)

Expected Operator/Plant Response	RO	BOP	CRS
Time= E19+10 min			
Note to Examiners - Crews may not implement ABN-601 due to still completing EOS-0.1A (with only a 3 man crew may be limited). May lose EDG 1-02 and then Crew would go to ECA-0.0A			
Annunciators:			
Numerous Annunciators Located on CB 14 panel			
1) Direct and Implement ABN-601 Section 5			
! Check 6.9 KV safeguard buses energized (Train B)			
! Check 6.9 KV non-safeguard buses energized			
! Check Blackout Sequencer			
! Check switchyard buses - will be de-energized			

1) Perform Attachment 20

! Refer to EPP-201 B> classify as NOUE

! Verify numerous transformer/switchyard status

! Re-energize various buses (next event before this can be completed)

2) Shift briefing, various announcements, contact distribution, and contact Prompt team

Note to Simulator Operator: Call RO and report lighting strike in switchyard and high winds. Load Met Tower with wind speed of 105 mph (sustained)

Comments: Bold Denotes Critical Task

Scenario Number: 1	Event Number: 7	Facility: CPSES

Brief Description: EDG 1-02 trips on overspeed B> Loss of all power

Expected Operator/Plant Response	RO	BOP	CRS
Time= E19+16 min			
Annunciators:			
Numerous annunciators			
1) Direct and Implement ECA-0.0A			
! Verify Rx trip			
! Verify turbine trip			
! Check RCS isolated			
! Verify AFW flow > 460 gpm			
! Power can not be restored to AC safeguards bus - go to ABN-601, Step 6			
! Initiate DC bus load shedding - Control Room calls and has someone begin to load shed - local actions			

! **Depressurize intact SGs to 270 psig**

! Send PEO to check on EDG trip (trip on overspeed)

2) Direct and Implement ABN-601

! Start the DG per Attachment 1- EDG restarted AFTER SG depressurization started

! Transition back to ECA-0.0A

! After SG pressures have been stabilized - end of scenario (based on Chief Examiner)

Comments: Bold Denotes Critical Task

Critical Task Descriptions

Event 2:
Rx does not trip on low S/G level B"> on S/G level transmitter failure, with proper actions, the operators should be able to control S/G water level in manual without causing a low S/G water level RX trip. Per NUREG 1021, App D, Step D.1a., Aprevent inappropriate actions that creat a challenge to plant safety (such as an unintentional reactor protection system (RPS) or ESF actuation).@

Event 4:
Trip the reactor due to high RCP vibration - preventing a challenge to plant safety and a degradation of any barrier to fission product release (App D, Step D.1.a)

Event 7:
Depressurize intact SGs C> Reduce temp and press of RCS to reduce RCP seal leakage and minimize RCS inventory loss (no way to makeup). (preventing a challenge to plant safety (App D, Step D.1.a))

Appendix DScenario OutlineForm ES-D-1

Facility: Comanche Peak (CPSES) Scenario No.: 2 Op-Test No.: 2001

Examinerson Operators: _____
_____
_____
_____

Initial Conditions: 100% power and steady.

Turnover: No equipment is out of service. Train A equipment is in service. Maintain turbine/reactor power at 100%.
Time = 0 when crew assumes the watch.

Event No.	Malf. No.	Event Type*	Event Description
1 T= E1+1	RX05B	I (SRO) I (RO)	PRZR Level Instrument LT-460 fails low **(Start Event 2 prior to RO/BOP tripping bistables)** Note to sim. oper. B> T=0 insert SW03A - SSW Train A, PIS-4251 failure (prevents CCWP 1-02 auto-start when SSWP 1-01 trips)
2 T= E1+11	SG01B **	C (All)	RCS leak 2 gpm (SG 1-02 tube leak B> ABN-106). Also put in applicable alarms based on leak rate (condenser off-gas, S/G blowdown, etc.)
3 T= E1+11		N (SRO) N (BOP) R (RO)	Commence plant shutdown B> RCS leak rate (IPO-003A)
4 T= E2+0	ED07B ***	C (All)	Loss of Protection Inverter IV1PC2 (ABN-603) -**Trigger as determined by Chief Examiner based on downpwr**
5 T= E2+10	SW01A	C (All)	Station Service Water Pump 1-01 shaft seized and CCW 1-02 does not auto start (ABN-501)
6 T= E2+17	EN01 (100%) MS01B (5E6 lbm/hr)	M (All)	Seismic event (>SSE) causes S/G 1-02 tube rupture Faults S/G 1-02 (S/G 1-02 pressure goes <300 psig)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
** SG01B increase to 500 gpm when seismic event occurs
***E2 trigger should be actuated after sufficient downpower as determined by Chief Examiner

Scenario Number: 2	Event Number: 1	Facility: CPSES		
Brief Description: PRZR Level Instrument LT-460 fails low				
Expected Operator/Plant Response		RO	BOP	US
Time = E1 + 1 min				
Annunciators:				
PRZR LVL LO (5B-3.6)				
PRZR LVL DEV LO (5C-1.2)				
5) Directs and Implements the actions of ABN-706				
! Manually controls LK-459 APRZR LVL CTRL@ or FK-121, ACCP CHRG FLO CTRL@				
! Transfer LS-459D, APRZR LVL CTRL CHAN SELECT@ to an alternate channel				
! Ensure LS-459E, LR-459 APRSR LVL SELECT@ selected to a valid channel				
! Place controller in AUTO				
! Establishes letdown per Attachment 6				
2) Refers to T/S 3.3.1 - place channel in trip within 6 hrs T/S 3.3.3 - no action				
3) Contacts Prompt Team and Ops Management				
RX does NOT trip on high PRZR level				
Comments:		Bold Denotes Critical Task		

Scenario Number: 2	Event Number: 2	Facility: CPSES		
Brief Description: RCS Leak S/G 1-02 tube leak, approx 2 gpm (ramps up and stabilizes)				
Expected Operator/Plant Response		RO	BOP	US
Time = E1 + 11 min				

Annunciators:
PC-11 annunciators - main steam line 2 rad monitor MSL179, condenser off-gas, and S/G blowdown and sampling

1) Directs and Implements Procedure ABN-106

- **!** Verifies main steamline rad alarms - if MSL179 rad alarm in, reduce power to ≤50% in 1 hr
- **!** Initiate required shutdown per IPO-003A
- **!** Adjust affected SGARV controller setpoint to 1160 psig
- **!** Check PC-11 for increases in rad levels discharging to LVW and stop or divert flow
- **!** Request Chemistry to sample SGs

2) Directs and Implements Procedure ABN-103

- **!** Verify at least one charging pump operating
- **!** Ensure PRZR level at or trending to prog. level
- **!** Check PRZR status - safeties closed, PORVs closed, spray valves closed, and PRT level and temp no significant increase
- **!** Check S/G status - normal levels, no significant feedwater/stm mismatch, and no increased radiation trend on PC-11.

Note: Operators may use ABN-103 along with ABN-106. They may NEVER go to ABN-103, not required.

Comments: Bold Denotes Critical Task

Scenario Number: 2	Event Number: 3	Facility: CPSES
Brief Description: Plant shutdown per IPO-003A		
Expected Operator/Plant Response	RO	BOP	US

Time = E1 + 11min

Annunciators:
None

1) Direct and Implement the power reduction per IPO-3A

- **!** Contact Chemistry to place demins in service
- **!** Calculate the amount of boration needed to reduce power to approx 575MW (operators will probably initial boration - 100gallons?)
- **!** Initiate RCS boration and inward rod motion
- **!** Set in the desire unloading rate on the LOAD GRADIENT device
- **!** Lower the LOAD REFERENCE device to 575 MW
- **!** Verify proper rod bank insertion, overlap, and sequencing
- **!** When turbine power is approx 50%, stop one main feedwater pump

Comments: Bold Denotes Critical Task

Scenario Number: 2	Event Number: 4	Facility: CPSES

Brief Description: Loss of Protection Inverter IV1PC2

Expected Operator/Plant Response	RO	BOP	US
Time = E2 + 0			
Annunciators:			
118V CHAN 2 INV TRBL (10B-2.16)			
Note: IV1PC2 - acrid odor present and hotter than normal			
1) Directs and Implements the actions of ABN-603			

! Verify loss did NOT cause a Rx trip

! Place control rods in manual

! Verify PRZR level and pressure and take manual control if necessary

! Manually control feed flow to S/G2 & S/G3 (feed flow increases)

! Reenergize IV1PC2 to alternate pwer supply

2) Refer to T/S 3.8.7 and 3.8.9

Comments: Bold Denotes Critical Task

Scenario Number: 2	Event Number: 5	Facility: CPSES

Brief Description: Station Service Water Pump 1-01 shaft seizure and CCW Pump 1-02 does not auto start. CCW Punp 1-02 does not auto start due to failure of SSW hdr press switch.

Expected Operator/Plant Response	RO	BOP	US
Time = E2 + 10 min			
Annunciators:			
CCP 1 L\O CLR SSW RET FLO LO (1-1.11)			
SIP 1 L\O CLR SSW RET FLO LO (1-1.12)			
DG **2** SSW RET FLO LO (1-3.11)			
1) Directs and Implements Procedure ABN-501			
! Verify SSW Pump 1-02 running			
! Manually start CCW Pump 1-02			

! Shutdown Train A equipment (CCP, DG, SI Pump, CS Pumps - pull out) and start required Train B equipment

! Verify proper operation of Train B equipment

2) Refer to T/S and makes notifications to Ops management

3) Conduct crew brief

Comments: Bold Denotes Critical Task

Scenario Number: 2	Event Number: 6	Facility: CPSES

Brief Description: Seismic event (>SSE) causes S/G 1-02 tube rupture (500 gpm?) and faulted S/G (S/G 1-02 pressure <300 psig) ADVERSE CONTAINMENT

Expected Operator/Plant Response	RO	BOP	US

Time = E2 + 17 min (Rx trip/SI)

Annunciators: LOTS

1) Directs and Implements Procedure EOP-0.0A

! Verifies Rx trip/bypass bkrs open and flux dec.

! All rod bottoms lights on

! Verifies turbine trip

! Verifies power to AC safeguards buses

! Verifies both Trains SI actuated

! Verifies Containment Spray required and Phase B isolation

- ! Verifies CCW and RHR pumps running
- ! Verifies FW isolation complete
- ! **Stops RCPs (criteria should be satisfied)**
- ! Transition to FRZ-0.1A for high containment press (due to Orange Path on Containment Status Tree)

2) Directs and Implements Procedure FRZ-0.1A

- ! Verifies containment Phase A and containment ventilation isolation

Comments: Bold Denotes Critical Task

Scenario Number: 2	Event Number: 6 (Continued)	Facility: CPSES

Brief Description: Seismic event (>SSE) causes S/G 1-02 tube rupture (500 gpm) and faulted S/G (S/G 1-02 pressure <300 psig)

Expected Operator/Plant Response	RO	BOP	US
3) Directs and Implements Procedure FRZ-0.1A (cont)			
! Checks containment spray required and spray flow	___	___	___
! Verifies all RCPs stopped	___	___	
! Verifies Containment Phase B isolation	___	___	
! Verifies MSIV and MSIBV closed	___	___	
! Check feed flow isolated to SG 1-02	___	___	
! Return to EOP-0.0A and step in effect	___	___	
3) EOP 0.0 A B> Determines faulted S/G and transitions to EOP-2.0A, A Faulted S/G Isolation@			___
4) Directs and Implements Procedure EOP-2.0A			___
! Checks MSIVs and bypass valves shut			___
! Identifies faulted S/G - pressure decreasing in an uncontrolled manner or completely depress	___	___	
! **Isolates faulted S/G**	___	___	
! Check secondary radiation - should be high	___	___	___
! Transition to EOP-3.0A, AS/G Tube Rupture@	___	___	

END OF SCENARIO

Comments: Bold Denotes Critical Task

Critical Task Descriptions

Event 1:

RX does NOT trip on high PRZR level C> with proper actions, the operators should be able to control PRZR water level in manual without causing a high PRZR water level RX trip. Per NUREG 1021, App D, Step D.1a., Aprevent inappropriate actions that creat a challenge to plant safety (such as an unintentional reactor protection system (RPS) or ESF actuation).@

Event 6:

Stops RCPs if criteria satisfied C> depending on the conditions of the accident, for a SBLOCA, the RCPs should be tripped when specified parameters are met. The RCPs should be tripped to avoid more serious impacts. If the criteria is not satisfied, the pumps should continue to be operated because they can provide core heat removal without ECCS in operation.

Isolates faulted S/G C> minimizes RCS cooldown and mass and energy release to the containment (reduces challenge to containment). App D, Step D.1a., Aprevent inappropriate actions that creat a challenge to plant safety (such as an unintentional reactor protection system (RPS) or ESF actuation).@

Appendix DScenario OutlineForm ES-D-1

Facility: Comanche Peak (CPSES) Scenario No.: 3 Op-Test No.: 2001

Examinersry Operators: _____
_____
_____

Initial Conditions: 100% power and steady.

Turnover: EDG 1-02 and CCP 1-02 are out-of-service for preventive maintenance. Train A equipment is in service. The shift has been ordered to remove MFP 1-01 from service for maintenance B> 15%/hr

Time = 0 when Chief Examiner determines enough power reduction has been seen
See next page for preload information!!!!!!

Event No.	Malf. No.	Event Type*	Event Description
1		N (SRO) R (RO) N (BOP)	Downpower to remove MFP 1-01 from service - 15%/hr
2 T= E1+0	CV15	C (SRO) C (RO)	PCV-131, ALetdown Pressure Control Valve@ fails closed. **As determined by Chief Examiner - based on downpwr**
3 T= E1+8	TP01	C (SRO) C (BOP)	200 gpm TPCW leak
4 T= E1+18	RP06A	I (SRO) I (RO)	Loop 1 N16 fails high **(Start Event 5 prior to RO/BOP placing bistables in trip)**
5 T= E1+24	IA01A	C (All)	Instrument air leak - IA Receiver 1-01 relief valve lifting (Severity = 1500 scfm leak)
6 T= E1+30	RC19A	M (All)	RCS Loop A - 1000 gpm leak - ramp in over 5 minutes RCS Cold Leg 1 Leak (flow scaling)
7 T= ??		C (All)	Rx will not trip in manual or automatic. Go to FRS-0.1A, A Response to Nuclear Power Generation/ATWT@
8 T= E19+2	SI04B	C(RO)	Train B SI Pump failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Preload Information

T=0:

- **!** RP01 Auto Rx trip failure
- **!** RP15E Rx trip breakers jammed closed
- **!** Override CS-T1B3, xfmr Breaker T1B3 closed
- **!** Override CS-1B3-1, incoming Breaker 1B3-1 closed
- **!** Dg 1-02 bkr to local, CCP 1-02 breaker racked out

Scenario Number: 3	Event Number: 1	Facility: CPSES

Brief Description: Power reduction to remove MFP 1-01 from service (15%/hr)

Expected Operator/Plant Response	RO	BOP	CRS
Time = 0 when downpower ends per Chief Examiner			
Annunciators:			
None			
13) Direct and Implement the power reduction per IPO-3A			
! Contact Chemistry to place demins in service			___
! Calculate the amount of boration needed to reduce power to 575MW	___		___
(Rx engineering)			
! Initiate RCS boration and inward rod motion	___		___
! Set in the desire unloading rate on the LOAD GRADIENT device	___		
! Lower the LOAD REFERENCE device to approximately 575MW (Rx power = 50%)		___	
! Verify proper rod bank insertion, overlap, and sequencing		___	
! When turbine power is approx 50%, stop Main Feedwater Pump	___		
1-01	___	___	

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 2	Facility: CPSES

Brief Description: PCV-131, ALTDN Press Ctrl Valve,@ fails closed

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1 + 0			

Annunciators:

LTDN HX OUT PRESS/FLO HI (6A-3.3)
LTDN RLF VLV OUT TEMP HI (6A-4.3)

1) Refer to ALM-0061A

   ! Letdown press > 310 psig, isolates letdown B> closes 1/1-8149A, 1/1-8149B, and 1/1-8149C and transitions to ABN-105

2) Directs and Implements Procedure ABN-105, Section 5.0

   ! Establishes excess letdown

      1) Simultaneously lower 1-FK-121 to 32 gpm and adjust 1-HC-182 to 6 to 13 gpm

      2) Align excess letdown per SOP-103A

3) Contacts the Prompt Team to repair PCV-131 and notifies Ops Managment

Note to Sim Oper: When called as PEO to open LCS-8409-RO, A U1 Ltdn Hx Out Press Ctrl Vlv Byp Remote Oper,@ report that the valve is stuck shut and CANNOT be opened

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 3	Facility: CPSES

Brief Description: 200 gpm TPCW leak

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1 + 8 min			
Annunciators:			
TPCW HEAD TK LVL LO (9A-2.10)			
1) Determines TPCW tank level has decreased			
2) Directs and Implements Procedure ABN-306			
! Verifies TPCW head tank level			
! Checks main generator for water inleakage **B**> sends PEO to check local indicators and annunciator GEN GAS MOISTURE HI (10A-1.10)			
! Ensures makeup aligned to TPCW head tank			
! Has PEO/FSS inspect TPCW for leaks (leak will be discovered on TPCW Pump 1-01 discharge.) Swaps pumps to isolate leak - shut suction and discharge valve.			
! Contacts Prompt Team and notifies Ops Management			

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 4	Facility: CPSES

Brief Description: Loop 1 N16 fails high

Expected Operator/Plant Response		RO	BOP	CRS
Time = E1 + 18 min				
Annunciators: (I think)				
ANY N16DEV HI/LO	(5C-1.5)			
1 of 4 OT N16 HI	(5C-2.5)			
1 of 4 OP N16 HI	(5C-2.6)			
1 of 4 OP N16 ROD STOP & TURB RUNBACK	(6D2.13)			
1 of 4 OT N16 ROD STOP & TURB RUNBACK	(6D-3.14)			
1) Directs and Implements Procedure ABN-704				
! Place control rods in manual and ensure T_{ave} is within 1°F of T_{ref}				
! Select the failed channel on 1/1-JS-411E, CHAN DEFEAT				
! Within 6 hours have I&C place bistable test switches for failed channel in the CLOSED position				
! Refer to T/S 3.3.1				
! Contacts Prompt Team and Ops Management				

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 5	Facility: CPSES

Brief Description: Instrument Air leak due to IA Receiver 1-01 relief valve lifting

Expected Operator/Plant Response		RO	BOP	CRS
Time = E1 + 24 min				
Annunciators:				
INSTR AIR HDR PRESS LO	(1-3.3)			

1) Determines IA system has a leak by acknowledging alarm and observing plant parameters

2) Directs and Implements Procedure ABN-301

- ! Verifies both IA compressors are running
- ! Determines IA press < 85psig
  - ! Starts and aligns a common IA compressor
  - ! Stops unnecessary use of IA
  - ! Sends PEO to determine cause of low IA press (PEO finds IA Receiver 1-01 relief valve lifting - able to reset the valve)
- ! Checks equipment on main control board for proper operation
- ! Contacts Prompt Team and informs Ops Managment

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 6	Facility: CPSES

Brief Description: RCS Loop A has a 1000 gpm leak ramp in over 5 minutes **(assume adverse containment)**

Expected Operator/Plant Response	RO	BOP	CRS

Time = E1 + 30 min

Annunciators:

CNTMT SMP 1 FILL RATE INCREASE	(2A-1.6)
CNTMT SMP 2 FILL RATE INCREASE	(2A-2.6)
PRZR LVL DEV LO	(5C-1.2)
CHRG FLO HI/LO	(6A-3.4)

1) Determines RCS has a leak by acknowledging alarms and looking at plant parameters

2) Directs and Implements Proc. ABN-103 (Crew may choose to Trip & SI due to XS Ltdn and Charging problems)

- ! Verify at least one charging pump operating
- ! Ensure PRZR level at or trending to program level setpoint (Continuous Action Step)
  - ! Take manual control of charging pumps
  - ! If PRZR <17%, then isolate letdown
  - ! If PRZR decreases in an uncontrollable manner, trip Rx and initiate SI
  - ! Start additional CCP
- ! Check PRZR status - PORVs, safety valves, and spray valves closed and no sig. increase in PRT level and temp
- ! Dispatch personnel to search for leaks

3) Directs an manual scram and SI actuation or automatic Rx trip/SI - Enter EOP-0.0A

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 7	Facility: CPSES

Brief Description: Reactor will not trip in manual or automatic

Expected Operator/Plant Response	RO	BOP	CRS

Time = E1 + 30?

Annunciators: LOTS

1) **Recognize that Rx will not trip** - may try opening Bkrs CS-T1B3 and CS-1B3-1 on CB - won=t open

2) Exits EOP-0.0A and transitions to FRS-0.1A

3) Directs and Implements Procedure FRS-0.1A

! Verify control rods inserting >48 step/min or manually insert control rods

! Initiate emergency boration and verify charging flow >30 gpm

! Dispatch an operator to locally trip the reactor

Sim Oper: After being dispatched as PEO, trip Rx 1 min later

! Maintain AFW >860 gpm until narrow >26% (maintain level 26%-50%)

! Verify Rx subcritical and return to EOP-0.0A

4) Directs and Implements EOP-0.0A

! Verify all rod bottom lights on & turbine tripped

! Verify power to AC safeguard busses

! Verify both SI trains actuated, Train B pump trips **(see Event 8)**

! Check status of cont. spray

! **Stop RCPs if criteria satisfied**

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 7 (continued)	Facility: CPSES

Brief Description: Reactor will not trip in manual or automatic (continued)

Expected Operator/Plant Response	RO	BOP	CRS
4) Directs and Implements EOP-0.0A (continued)			
! **Determines RCS in NOT intact and transitions to Procedure EOP-1.0A**			

5) Directs and Implements EOP-1.0A

! **Stop RCPs if criteria satisfied**

! Check if any S/G faulted - none

! Check S/G levels >26% and maintain 26-50%

! Check secondary radiation normal

! Check if ECCS flow should be reduced (pressure should be stabilzed/increasing)

TERMINATE Scenario at completion of Step 6 of EOP 1.0 - this is determination of whether to terminate SI or continue in EOP-1.0 depending on plant conditions at time. US may go to EOS 1.1A or stay in EOP-1.0A

Comments: Bold Denotes Critical Task

Scenario Number: 3	Event Number: 8	Facility: CPSES
Brief Description: Train B SI Pump Starts and Coupling Breaks		

Expected Operator/Plant Response	RO	BOP	CRS

Time: E19 + 2 min

Annunciators:

1) Recognizes that SI pump is not working (amperage is low and essentially zero flow)

! Dispatch AO to visually inspect the pump

! When AO reports coupling broke (approximately 7 minutes after recognition of problem), secure the pump - pull to lock

Note: Crew may attempt to manually restart tripped SI pump ONE time only!!!

Comments: Bold Denotes Critical Task

Critical Task Descriptions

Event 7:

Both together as one critical task B> Recognize that Rx will not trip and Initiate emergency boration and verify charging flow >30 gpm C> reactor will not trip in automatic or manual. Requires driving rods (automatic) and emergency boration. (Failure of an ESF system)

Stop RCPs if criteria satisfied C> depending on the conditions of the accident, for a SBLOCA, the RCPs should be tripped when specified parameters are met. The RCPs should be tripped to avoid more serious impacts. If the criteria is not satisfied, the pumps should continue to be operated because they can provide core heat removal without ECCS in operation.

Determines RCS in NOT intact and transitions to Procedure EOP-1.0A C> abnormal containment radiation, pressure, or recirculation sump level is an indication of a line break inside containment. Since the S/Gs were determined to be non-faulted, leak must be in RCS. (Degradation of any barrier to fission product release)

Facility: Comanche Peak (CPSES) Scenario No.: 4 (SPARE) Op-Test No.: 2001

Examinerson Operators: _____
_____
_____

Initial Conditions: 50% power and steady (RP01). Auto RX tips failed.

Turnover: No equipment is out of service. Train A equipment is in service. FWP repairs have been completed by the previous shift. You have been directed to return to 100% power @8%/hr not to exceed 10%/hr.

Event No.	Malf. No.	Event Type*	Event Description
1		N(SRO) N(BOP) R(RO)	Increase Reactor power back to 100%
2** E1+0	MS13A	I(RO) I(SRO)	MSL 1 Press Instrument PI-2325 fails high (100%)
3 E1+7	FW16	C(RO) C(BOP) C(SRO)	Lowering vacuum on main condenser due to loss of vacuum breaker water seal (6% severity)
4 E1+17	Rx15A	C(RO) C(SRO)	Pzr spray flow control valve failure (PCV-455B) @ 60% severity. RXR96 is PCV-455B CTRL driver card - remove then delete malfunction
5 E1+30	TC06C MS07A MS10A1 @100%	M(ALL)	Main turbine spurious trip and MSIV #1 closes causing SG1 Safety MS-021 to fail open

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

** Note - Initiate after Chief Examiner determines power increase is sufficient

PRELOAD INFORMATION

T=0 B> RP01 Auto Rx Trip Failure

Scenario Number: 4	Event Number: 1	Facility: CPSES		
Brief Description: Increase Rx Power - approx 8%/hr				
Expected Operator/Plant Response		RO	BOP	CRS
Time = 0 min Annunciators: None 3) Increase reactor power per IPO-003A				
! Provide shift briefing				___
! Calc amount of dilution needed to raise power to 1145 Mwe (Rx Eng data)				
! Initiate dilution and outward rod motion		___		___
! Set desired loading rate on the LOAD GRADIENT device		___		
! Raise the LIMIT LOAD device to >1180 MW		___		
! Raise the LOAD REFERENCE device to increase turbine load		___	___	
! Verify proper rod bank insertion, overlap, and sequencing		___	___	
		___		

Comments: Bold Denotes Critical Task

Scenario Number: 4	Event Number: 2	Facility: CPSES		
Brief Description: MSL #1 Press Instrument (PI-2325) Fails High				
Expected Operator/Plant Response		RO	BOP	CRS
Time = 0 Start when Chief Examiner determines enough power increase				

Annunciators:
AVE Tave - Tref DEV (6D-1.10)

1) Refers to ALM-0064A and diagnosis ARV open by control board indications

2) Directs and Implements ABN-709, Section 2.0

- **!** Determines PI-2325 failed high and ZL-2325 indicates valve open
- **!** Ensures SG 1 press <1125 psig and manually closes ARV
- **!** Notifies Chemistry to determine if release permit is required
- **!** Contacts Prompt Team and initiates repairs

Comments: Bold Denotes Critical Task

Scenario Number: 4	Event Number: 3	Facility: CPSES
Brief Description: Main Condenser Air In-leakage		

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1 + 7 minutes			
Annunciators:			
AVE Tave-Tref DEV (6D-1.10)			
CNDSR VAC LO (9B-4.5)			
1) Determines Condenser Vacuum Lowering			
2) Directs Actions of ABN-304, Section 3.0			

! Starts all available condenser vacuum pumps

! Notifies Shift Manager and Load Dispatcher of imminent load reduction

! Reduces turbine load as necessary per IPO-3A

! Notifies Chemistry of excessive air in-leakage

! Dispatches personnel to check for leaks

Note to Simulator Operator: 2 minutes after being dispatched as PEO to check for leakage paths, remove Malf FW16 and report back that main condenser vacuum breaker loop seal was empty and has been refilled

! Stop unnecessary CEVs per SOP-309

Critical Task - Turbine/Rx trip does not occur on low condenser vacuum.

Comments: Bold Denotes Critical Task

Scenario Number: 4	Event Number: 4	Facility: CPSES

Brief Description: PZR Spray Valve PCV-455 fails to 60% open

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1 + 17 minutes			
Annunciators:			
PRZR PRESS LO BACKUP HTRS ON (5C-3.3)			
PRZR LO PRESS PORV 456 BLK (5B-1.6)			
PRZR LO PRESS PORV 455A BLK (5B-2.6)			
1) Determines PRZR Spray Valve RC Loop 1 is open			
2) Directs Actions of ABN-705, Section 3			
! Attempts to close Spray Valve PK-455B			

! Initiate load reduction to 40% per IPO-3A

! Ensures all PRZR heaters are on

! Directs I&C to de-energize Spray Valve PCV-455B by removing 1-PCY-0455B Driver Card

Note to Simulator Operator: After 1 minute, using remote function RXR96, remove/pull PCV-455B Ctrl Drive Card and remove malfunction RX15A. Report back to control room that card has been removed.

! Check PRZR pressure trending to normal

! Contact Plant Management and initiate repairs

Critical Task B> Rx does not trip on low press

Comments: Bold Denotes Critical Task

Scenario Number: 4	Event Number: 5	Facility: CPSES

Brief Description: Turbine Spurious trip, MSIV #1 closure, Stm Line Safety Valve 1MS-0021 fails open

Expected Operator/Plant Response	RO	BOP	CRS
Time = E1 + 30 minutes			
Annunciators:			
TURB ELEC TRIP (9B-3.8)			
MSIV 1 NOT OPEN (7A-1.12)			
Various Others			
1) Determines #1 MSIV closed and Rx power >10%			
! **Trips the reactor**			
2) Directs and implements EOP-0.0			
! Verifies Rx trip and bypass brks open, all rod bottom lights on, neutron flux decreasing, and turbine tripped			

- **!** Verifies power to AC SFGD buses
- **!** Verifies SI actuated or is required
- **!** Determines SG1 is FAULTED and transitions to EOP-2.0

3) Directs and Implements EOP-2.0

- **!** Closes all MSIV-s and checks bypasses closed
- **!** Isolates #1 S/G including #1 MSL supply to TDAFWP
- **!** Checks for SGTR by verifying Secondary Rad levels -- normal
- **!** Transitions to EOP-1.0

Comments: Bold Denotes Critical Task

Scenario Number: 4	Event Number: 5 (continued)	Facility: CPSES

Brief Description: Turbine Spurious trip, MSIV #1 closure, Stm Line Safety Valve 1MS-0021 fails open

Expected Operator/Plant Response	RO	BOP	CRS
4) Directs and Implements EOP-1.0			
Check if RCPs should be stopped			
! Check for faulted S/Gs			
! Check intact S/G levels and Secondary Rad levels			
! Transition to EOS-1.1			

Terminate scenario when Crew transitions to EOS-1.1 or at the discretion of the Chief Examiner

Comments: Bold Denotes Critical Task